


Application No.: 10/629,247
Dated: December 13, 2004
Amendment

Claim 1 (Currently Amended): A method for treating refinery wastewater in the absence of any additional carbon source comprising:

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- (a) flowing the refinery wastewater in the absence of any additional carbon source into a treatment basin in order to form the contents of the treatment basin and treat the refinery wastewater;
 - (b) mixing the contents of the treatment basin;
 - (c) introducing oxygen into the treatment basin for a first predetermined time period of from about 10 to about 120 minutes;
 - (d) stopping the introduction of oxygen into the treatment basin for a second predetermined time period of from about 7.5 to 120 minutes;
 - (e) repeating said steps (c) and (d) a plurality of times;
- and
- (f) flowing the treated refinery wastewater out of the treatment basin into a clarifier, where treated refinery wastewater is separated into clarified liquid effluent and sludge.

Claim 2 (Original): The method of claim 1 further comprising recycling the sludge into the treatment basin.

Claim 3 (Currently Amended): The method of claim 2 wherein the treated refinery wastewater flowing from the treatment basin has a nitrate level of less than 5 ppm.

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Claim 4 (Currently Amended): The method of claim 1 wherein the treated refinery wastewater flowing from the treatment basin has a nitrate level of less than 5 ppm.

Claim 5 (Currently Amended): The method of claim 1 wherein the treated refinery wastewater flowing from the treatment basin has a nitrate level of less than 1 ppm.

Claim 6 (Original): The method of claim 1 wherein said first predetermined time period is substantially the same as said second predetermined time period.

Claim 7 (Original): The method of claim 1 further comprising measuring the oxygen content in the basin and controlling the introduction of oxygen into the treatment basin such that a concentration of oxygen in the range of about 40 to about 60 percent is maintained for the first predetermined time period.

Claim 8 (Original): The method of claim 1 wherein the temperature ranges from about 5 °C to about 35 °C.

Claim 9 (Currently Amended): The method of claim 1 wherein the refinery wastewater comprises about 50 ppm PO₄ as phosphoric acid.

Claim 10 (Original): The method of claim 1 wherein the pH is maintained in the range of about 7.0 to about 8.2.

Claim 11 (Original): The method of claim 1 wherein the first predetermined time period is different from the second predetermined time period.

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Claim 12 (Original): The method of claim 1, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin is from about 10 to about 22.5 minutes.

Claim 13 (Original): The method of claim 12, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 7.5 to about 20 minutes.

Claim 14 (Original): The method of claim 1, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 7.5 to about 20 minutes.

Claim 15 (Original): The method of claim 1, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin is from about 10 to about 20 minutes.

16. (Original) The method of claim 15, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 10 to about 20 minutes.

Claim 17 (Original): The method of claim 1, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 10 to about 20 minutes.

Claim 18 (Original): The method of claim 1, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin is from about 14 to about 16 minutes.

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Claim 19 (Original): The method of claim 18, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 14 to about 16 minutes.

Claim 20 (Original): The method of claim 1, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 14 to about 16 minutes.

Claim 21 (Original): The method of claim 1, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin and said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin are each about 15 minutes.

Claim 22 (Currently Amended): A process for reducing nitrogen compound levels in refinery wastewater in the absence of additional carbon source, comprising the steps of:

- (a) flowing the refinery wastewater in the absence of any additional carbon source into a treatment basin in order to form the contents of the treatment basin and treat the refinery wastewater;
- (b) mixing the contents of the treatment basin;
- (c) introducing oxygen into the treatment basin for a first predetermined time period of from about 10 to about 120 minutes;
- (d) stopping the introduction of oxygen into the treatment basin for a second predetermined time period of from about 7.5 to 120 minutes;
- (e) repeating said steps (c) and (d) a plurality of times;
- and
- (f) flowing the treated refinery wastewater out of the treatment basin;

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wherein the treated refinery wastewater flowing from the treatment basin has a nitrate level of less than 5 ppm.

Claim 23 (Currently Amended): The process of claim 22 wherein the treated refinery wastewater flowing from the treatment basin has a nitrate level of less than 1 ppm.

Claim 24 (Original): The process of claim 23 wherein said first predetermined time period is substantially the same as said second predetermined time period.

Claim 25 (Original): The process of claim 22 wherein said first predetermined time period is substantially the same as said second predetermined time period.

Claim 26 (Original): The process of claim 22 further comprising measuring the oxygen content in the basin and controlling the introduction of oxygen into the treatment basin such that a concentration of oxygen in the range of about 40 to about 60 percent is maintained for the first predetermined time period.

Claim 27 (Original): The process of claim 22 wherein the temperature ranges from about 5 °C to about 35 °C.

Claim 28 (Currently Amended): The process of claim 22 wherein the refinery wastewater comprises about 50 ppm PO₄ as phosphoric acid.

Claim 29 (Original): The process of claim 22 wherein the pH is maintained in the range of about 7.0 to about 8.2.

Claim 30 (Original): The process of claim 22 wherein the first predetermined time period is different from the second predetermined time period.

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Claim 31 (Original): The process of claim 22, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin is from about 10 to about 22.5 minutes.

Claim 32 (Original): The process of claim 31, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 7.5 to about 20 minutes.

Claim 33 (Original): The process of claim 22, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 7.5 to about 20 minutes.

Claim 34 (Original): The process of claim 22, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin is from about 10 to about 20 minutes.

Claim 35 (Original): The process of claim 34, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 10 to about 20 minutes.

Claim 36 (Original): The process of claim 22, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 10 to about 20 minutes.

Claim 37 (Original): The process of claim 22, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin is from about 14 to about 16 minutes.

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Claim 38 (Original): The process of claim 37, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 14 to about 16 minutes.

Claim 39 (Original): The process of claim 22, wherein said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin is from about 14 to about 16 minutes.

Claim 40 (Original): The process of claim 22, wherein said first predetermined time period of said step of introducing oxygen into the treatment basin and said second predetermined time period of said step of stopping the introduction of oxygen into the treatment basin are each about 15 minutes.